Powering your application using Energy Harvesting technology

COMPUTER CONTROLS

ENABLING
YOUR SUCCESS

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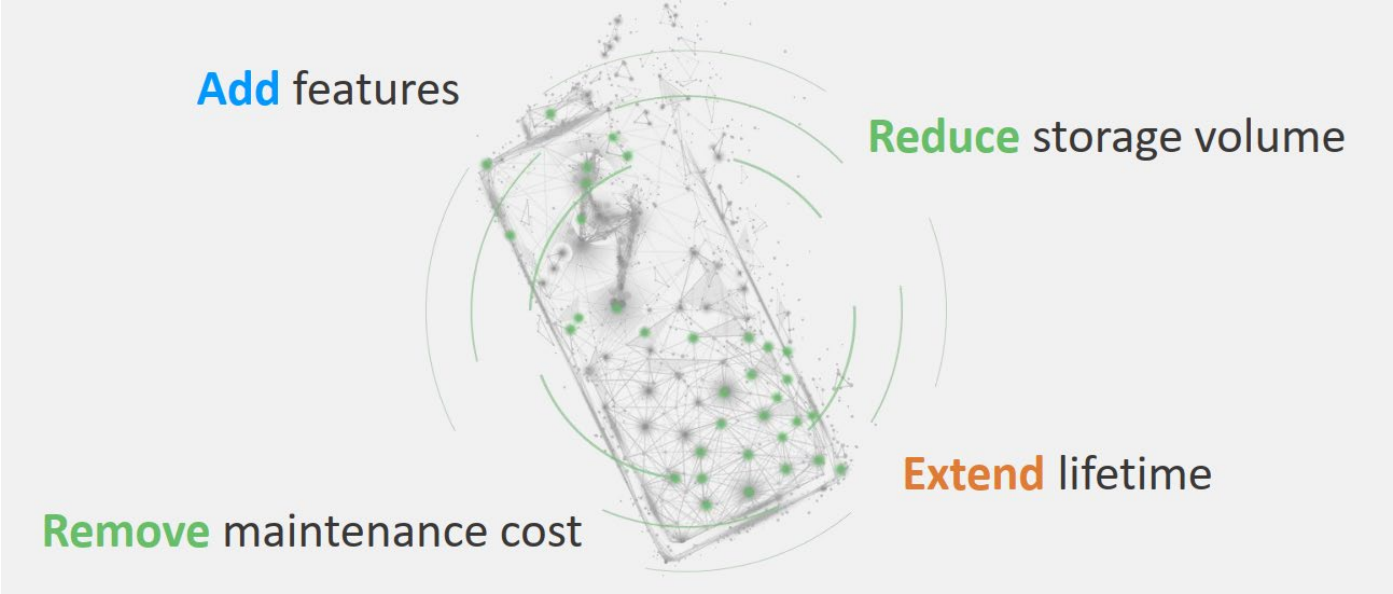
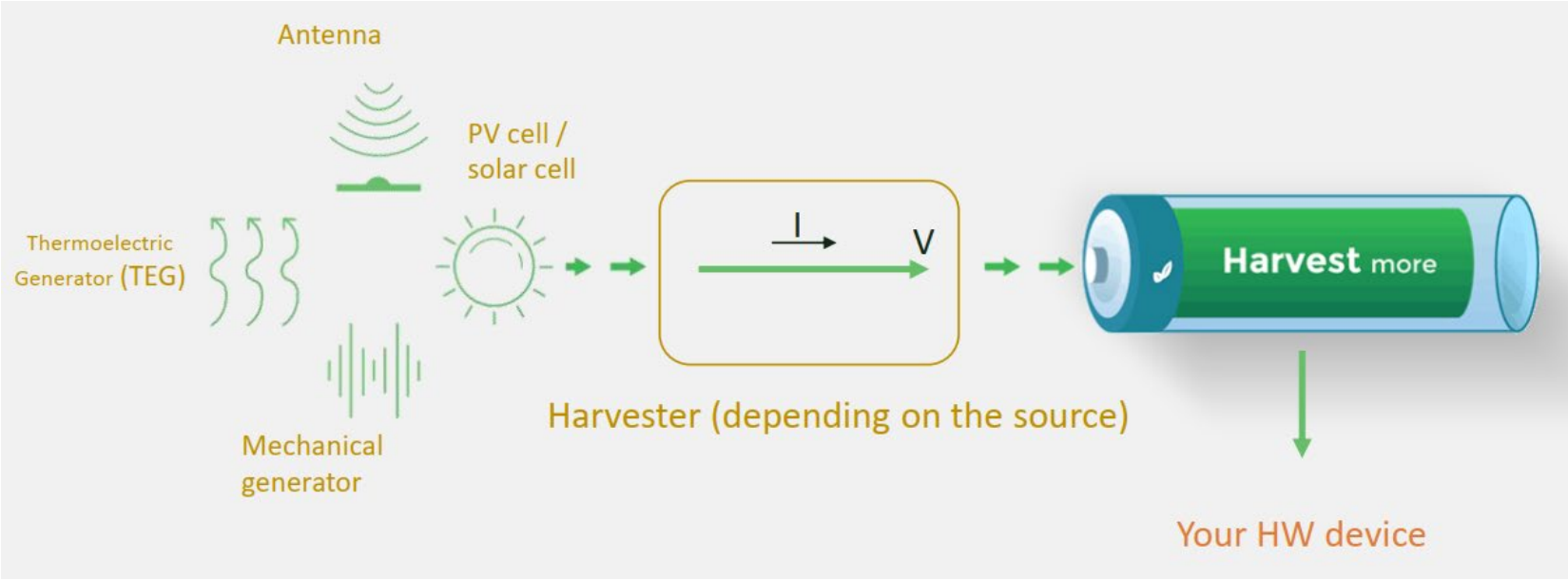
What is Energy Harvesting about ???



- **Harvest** more energy from **free** sources
- **Eliminate** battery from **the** device
- **Extend** battery life of **the** device

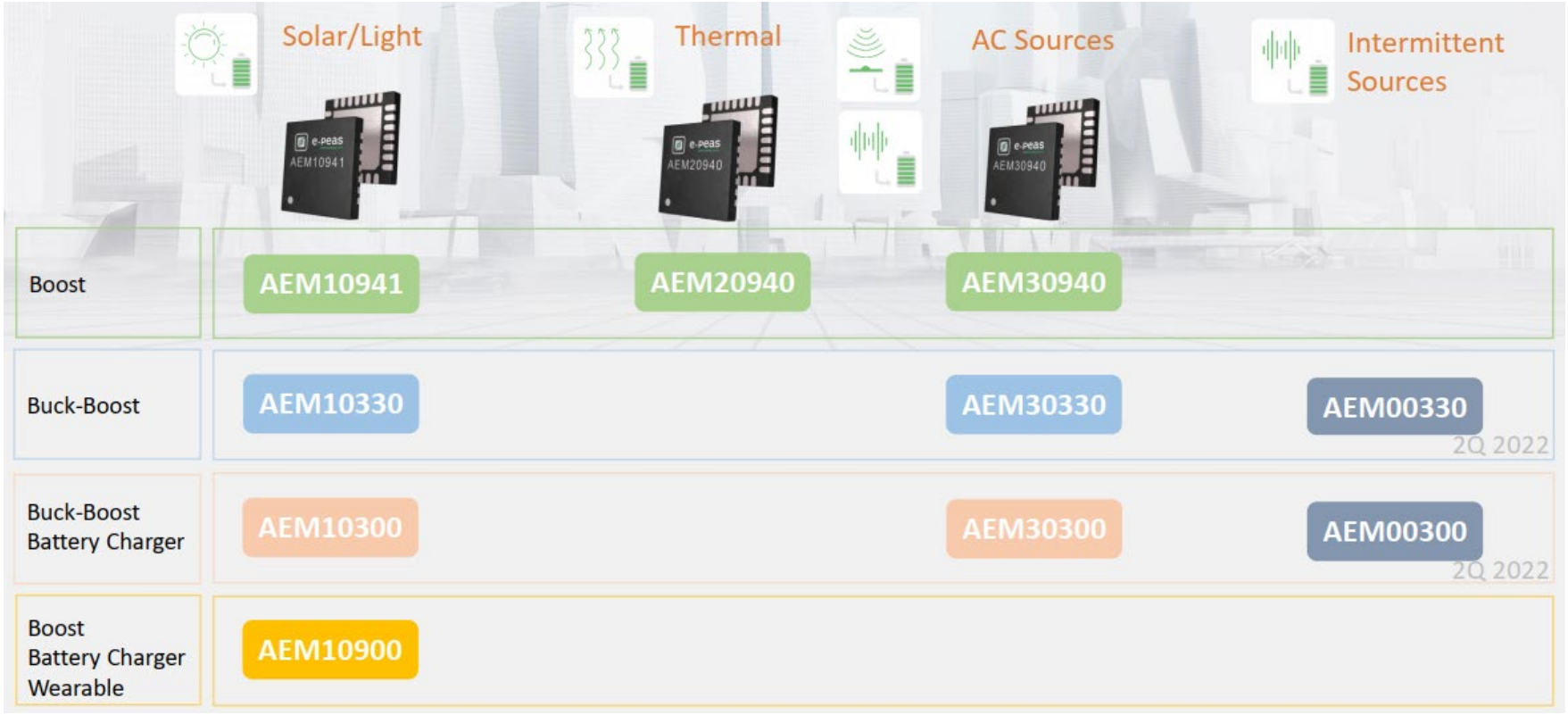
What is really needed ???



- **Energy** source with energy **collector**
- **Energy** converter - **PMIC**
- **Energy** storage element like **SuperCap** or **Battery**

What are the solutions ???

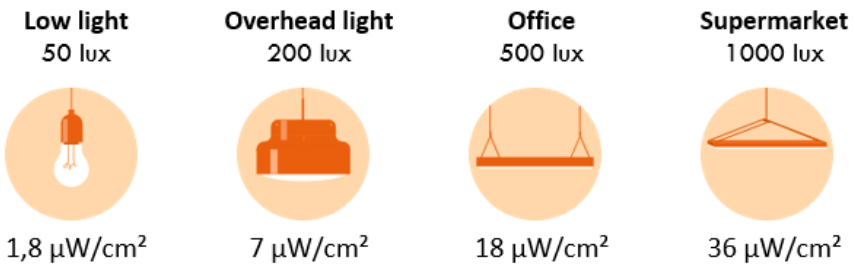
Energy converters

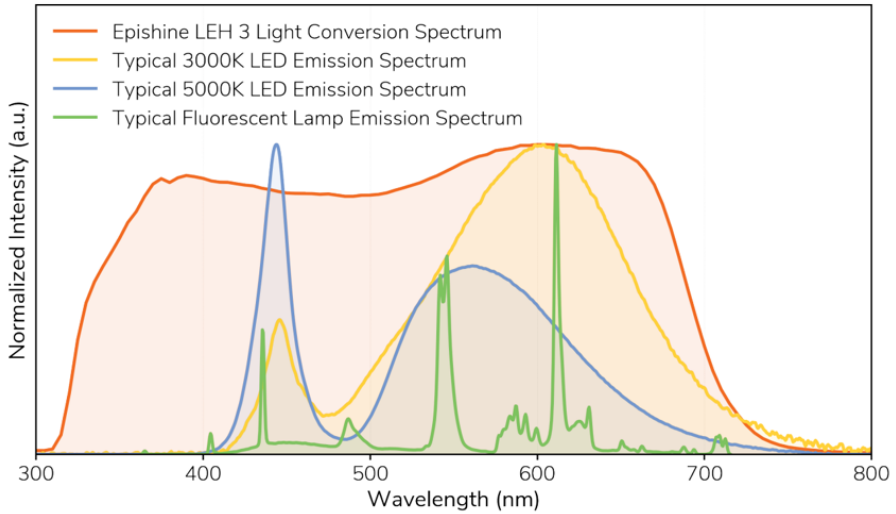


What are the solutions ???

Indoor PV cells

Product Code	Open Circuit Voltage[1,2] (V)	Short Circuit Current[1,2] (µA)	Output Power[1,2] (µW)	Cells	A (mm)	B (mm)	C (mm)	D (mm)
LEH3_50x50_6_10	3.8	147	418	6	50	50	71.5	60
LEH3_50x50_8_10	5.05	105	375	8	50	50	71.5	60
LEH3_50x30_6_10	3.8	88	250	6	50	30	71.5	40
LEH3_50x30_8_10	5.05	62	221	8	50	30	71.5	40
LEH3_50x20_6_10	3.8	59	167	6	50	20	71.5	30
LEH3_50x20_8_10	5.05	42	150	8	50	20	71.5	30





How to proceed ???

Question
Which type of source are available in the environment ? (Photovoltaic / thermal / mechanical / RF)
Where will the application be placed or used (indoor, outdoor, moving spot) ?
Regarding the load, is it already defined (sensors, µC, radio ?) **If so, could you share the part number and high-level schematic ?**
Could you describe the consumption profile (wake up, active time, passive time) ? When must it be working and when should it be sleeping ?
If known, what is the average power consumption of the load ? (mW) Do you know the consumption of each component ? (mW) Did you have measurement of the consumption ?
If using radio communication, did you define the protocol ?
If using radio communication, at which frequency do you need to communicate ? Do you have any idea of the radio consumption during active time ? (mW)
Apart from the radio is there any peak current (due to sensor or the electronic around) ? (Y/N)
If yes, please describe the peak current in terms of ampermeter (A) and seconds (s)
Which timelife do you target ? (years)
Is there any constraint on the start up time (if completely discharged) ? (s)
If no power available at the inputs, how long the application must be working ? (hours/days)
How much time the device will be used when the power at the source is **available** (an estimate)?
How much time the device will be used when the power at the source is **not available**? (an estimate)
Do you need back-up solution ? (Y/N)

Energy budget calculation

Technical details about the system (24 hours)	
Consumed Energy **E LOAD** (over 24 hours)	**1.037 J**
LDO Efficiency	70%
Technical details about the harvester	
Energy **E SRC** (over 24 hours)	**2.204 J**
Internal BOOST Efficiency	90%
Duration with light available	8 hours
Minimal power required at the harvester **P SRC**	76.543 uW
Primary battery as back-up	NA
Technical details about the storage	
Autonomy without any Power from the Source	16 hours
Stored Energy **E STORED**	**1.323 J**
Supercapacitor Size (Between 2.8V and 4.5V)	213.2 F
LIC Size (Between 2.5V and 3.8V)	323 F
Rechargeable Battery (Between 3V and 4.05V)	102.1 mAh
Temperature Working Range	Industrial

Market segments applications

Mobility
Asset Tracking
Automotive

Consumer
TV accessories
PC peripherals
Smart Homes

Retail
ESL

130 +
Active projects

Industrial
Smart Sensors
Smart monitoring

Wearable
Fitness band
Watch & Smart Watches

Agritech
Cattle Tracker